

# iGeneration And Their Acceptance of Technology

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## ABSTRACT

*Technology is becoming increasingly embedded into our lives. We are seeing a push towards digitization and online access. This can be a challenge for some because users' level of technical ability varies among the generations and other factors. Predicting technological innovations and how they might supplement, integrate with, or entirely replace existing technology is nearly impossible. These changes and innovations include many within the realm of education, including the relatively recent advent and increasing presence of e-Book sources and platforms. This study examines how higher education students across different generations are embracing electronic books in their studies. Students have more distractions than ever before. Using mobile devices smartly but having the ability to concentrate when you need to can be a challenge. Just because e-Books options are available and being increasingly adopted does not necessarily mean they are preferred by students. This study contributes to our understanding of their acceptance across different generations of students.*

**Keywords:** iGeneration; E-Books, Electronic Books; Open Access; Technology Acceptance

## INTRODUCTION

There has been much talk about the market potential for electronic books. Many parents and teachers have wondered how their child/students can concentrate or get anything done when Snapchat, Netflix, Facebook, Twitter and the rest of the Internet is only a click away. We can be connected to the online world 24/7 and there is quite a bit of temptation and it is easy to get lured away. For some this can lead to reading a book at a slower pace and perhaps reading fewer books or not get through the assigned material in class at all. However, the user might find it easier to search for information online or find the flexibility of always having the textbook with them more of an advantage than a disadvantage. This study explores the acceptance of e-Book technologies by students of the so-called Generation Z (also sometimes called the iGeneration) in comparison to students of other generations. Our hope is that this will be of interest to educators, publishers, government officials, and the technology industry alike. The results will help educators and textbook companies to provide the resources in the best possible way to stimulate student learning. It will aid government, publishers, and technology companies to better understand the consumer and how they would prefer their reading experience on an electronic device should be, as well as how accepted the technology is today.

Over half of American college students have used an e-textbook in at least one course (Dahlstrom & Bichsel, 2014). Many libraries continue to add e-Books to their collections. E-Books are reported being the preferred format for reference materials (Enis, 2016). However, a 2016 study by the journal, Library, sponsored by Gale Cengage Learning found that forty-seven percent of the respondents reported that students at their institutions preferred print when reading scholarly monographs compared with nineteen percent who preferred electronic books (Enis, 2016). No matter the preference, revenue from e-Book sales have been climbing according to some sources. In 2016, it was reported e-Book sales were \$7.59 billion compared to \$27 million in 2008 and Statista predicts continued growth (Statista, 2017). During this same time period publishers reported a decrease in their printed sales (Milliot 2010; Riess, 2011). However, the data reported is conflicting. According to Sweney (2016), printed book sales increased for the first time in four years as e-Books declined in 2016. Others reported a drop by 1.6% during the same time period (Meyer, 2016). Overseas, the e-Book sales for the UK's five largest publishers declined by 2.4% to 47.9 million units. This is the first drop in numbers of books sold in this medium since the digital age began (Flood, 2016).

Innovations continue and being able to use technology to foster learning can be a plus if the capabilities are there. It is important to provide students with various methods of learning the class material as well as strengthening continuous learning by keeping up with technology to keep readers engaged. If today's students are truly technology savvy compared to earlier generations, and if e-Books offer so much value to its readers, why hasn't there been more interest yet from younger generations? It seems like the older generation is more willing to try new technology and the younger generation prefer not to purchase textbooks at all. Most readers still seem to like to hold a hard copy in their hand; it is something they feel more comfortable with, as it is part of our culture. Henke (2001) stated that e-Books are about 50% technology and 50% culture. We may soon see if there will be a cultural shift towards this technology. It is not yet clear if college students will more fully embrace e-Book formats for their textbook needs by choice or not.

There are movements towards e-Textbooks within the education and government sectors. The Higher Education Opportunity Act of 2008 (HEOA) resulted in efforts such as relying more on textbook rental and buy-back programs, supplying used textbooks and information about textbook costs to students ahead of time, and educating faculty about cost-cutting options (NPEC, 2009). This helps ensure that students have access to affordable course materials. States like California, Florida, Minnesota, North Dakota, and Washington are on the forefront. In 2012, California passed a bill that giving local Universities 50 electronic books targeted to lower-division courses, giving state residents the option to either download the books for free through the California Digital Open Source library or to purchase a digital version for a modest fee of \$20 (Schwartz, 2012). Innovations like these allow students to become acquainted with the technology which may lead them to choose e-Books in the future. There is no doubt that e-Books are good for the environment and they have potential to cut down on the costs students and parents are facing. Furthermore, U.S. Senators Dick Durbin (D-IL) and Al Franken (D-MN) authored the Affordable College Textbook Act November 13, 2013, which would grant higher education institutions the option to support a pilot program that would increase the use of open books to potentially save users money (Band, 2013; Durbin, 2013).

A Florida initiative in 2010 encouraged faculty to develop and use more open source textbooks. With the establishment of the Florida Academic Library Services Cooperative, a library automation system was created that all public postsecondary education institutions will use to supplement learning, teaching and research efforts and needs (Millard, 2014). In Minnesota, efforts have been made to gather data on the number of Open Educational Resources (OERs) that are available and used. In addition, they were tasked with reducing the cost of student instruction by one percent and to use these savings to further support OERs (Millard, 2014). In North Dakota, the legislative mandated that management investigate the use of open textbooks in the state's University System and explore potential partnerships with other states. The resolution led in 2014 to a proposal to build a partnership with the University of Minnesota, which in 2012 had developed a library of free online textbooks. Their Board of Higher Education provided a budget of half a million dollars for open textbooks (Millard, 2014). Policies adopted in the state of Washington require faculty to consider selecting the least expensive textbook editions available and to collaborate in developing free online web and library resources. Furthermore, Washington adopted H.B.1244 in 2009 which budgeted \$1.2 million to state community and technical colleges to support OER to facilitate increased access, decrease cost, and improve the quality of courses (Millard, 2014).

Within secondary and higher education, there has been much new interest in open-source-textbooks and open access journals. This is somewhat controversial because it costs a lot of money to make a good textbook with supporting materials and textbooks being published through a publishing company go through editorial scrutiny. Instructors also need continuity in the material being available as it takes a long time to redo the lectures and other course materials. Additionally, it is very expensive to run a publishing house. The operation must either be subsidized, or there needs to be advertisement, or the author has to pay a fee. Journal articles must be reviewed, websites need to be maintained, the operation needs to be maintained, it can be expensive to run a server to store these articles on. Journals cannot always be run on an unpaid-submission basis.

Whether students like it or not, there is a movement towards use of e-Book versions of textbooks. The purpose of this research is to investigate the acceptance of electronic textbooks among Generation Z. Specifically, we attempt to answer the following questions: (1) How does the student's major in college, gender, generational age relate to e-Book use? (2) What are the types of e-Books used? (3) What is their rate of use? (4) What are the most influential factors regarding electronic textbook adoption?

## **LITERATURE REVIEW**

In 1997, Wyatt published an article on technology and libraries which indicated e-Books might be part of the future (Wyatt, 1997). Little did we all know how the sale of portable devices would make these changes possible and to what extent. Publishers have been pushing electronic textbook sales in recent years. Companies like Pearson and Wiley has been creating a lot of online interactive materials for instructors to use online on their platform along with their books. Publishing costs have risen and this gives the publishers a new niche. Student might enjoy having online interactive materials available to them.

To clarify, an electronic textbook is a book intended to be used for instruction. In most cases, there are support materials such as practice problems, discussion questions, test questions, chapter outlines and summaries, etc., to help support the student learning process. Nevertheless, for many university courses the instructor assigns traditional books. For this study an e-textbook can be an ordinary book or textbook in electronic format.

### **Traditional Textbooks vs. Electronic Textbooks**

Several articles and studies have been written and conducted on electronic vs. traditional textbooks over the years. However, the technology, user acceptance, and the generations are changing. Despite the changes, many research studies report that students prefer traditional textbooks (Cassidy, Martinez, & Shen, 2012; Gregory, 2008; Hannigan, 2007; Lewontin, 2014; NACS, 2014; Siebenbruner, 2011; Simon, 2002; Tan, 2014; Weisberg, 2011; Woody, Daniel & Baker, 2010). Cassidy, Martinez, and Shen (2012) looked at e-Book usage among advanced researchers, investigating the differences in perception, attitudes, and behavior between adapters and non-adapters of electronic Books. The result from their survey indicates that the advanced researchers favored hard copy books. The research also showed that several participants of the study were unaware of the e-Book availability at their library as well as the features e-Books may offer its users. Gregory (2008) conducted a survey on four of their core undergraduate classes at College of Mount St. Joseph in Cincinnati, Ohio and showed that the students prefer e-Books for research purposes, but prefer to use hard copy books for any other task to be completed. Hannigan (2007) conducted a survey to determine library user's awareness of e-Books. The results from his study indicated additional marketing may be needed regarding the availability of e-Books. The participants also reported that they found it challenging to read all materials online. On the other hand, Lewontin (2014) examined the acceptance rate of e-Books among undergraduate students, faculty and staff at Wellesley College in Massachusetts and revealed a clear inclination for hard copy books. In addition, the National Association of College Stores (NACS) has been conducting yearly studies since 2010 to determine student's preferences regarding printed textbooks vs. electronic textbooks for college usage and reported that students prefer using printed textbooks (NACS, 2010, NACS 2011, NACS, 2014). Woody, Daniel and Baker (2010) looked at student book preference, e-Books vs. hard copy books. They reported that the survey participants preferred hard copy books and that reading an e-Book is not equivalent to reading a traditional book. Siebenbruner (2011) conducted a quasi-experimental study comparing undergraduate psychology students' academic performance and experiences as a function of using electronic vs. traditional textbooks. Users of traditional textbooks reported that they contributed more to their learning than did electronic textbooks. Simon (2002) distributed e-Books to college introductory biology students who later received a survey which revealed that students were eager to adopt the technology. Weisberg (2011) studied student behavior and attitude towards the use of digital textbooks and found no significant difference in learning between e-textbooks and hard copy textbooks and that students are becoming more receptive to and accepting of using digital textbooks. A recent study conducted by Hewlett Packard at San Jose State University reported that 57% still prefer printed text, 21% prefer e-textbooks and 21% prefer both formats and that users perhaps prefer to read how-to books and study guides online instead of other books (Tan, 2014).

In the meanwhile, other studies demonstrate that users desire electronic textbooks over hard copy versions (Abdullah & Gibb, 2008; Croft & Davis, 2010; Ongoz & Baki, 2010; Shelburne, 2009). The variation in the user's preference might have to do with the type of technology the user opts to read their electronic textbook on (Grasha & Yangarber-Hicks, 2000) as well as when they were born, where they are from, and their academic interests. This study will expand on these claims. Abdullah & Gibb (2008) reported that students indicated that their preferred book formats depended upon the context of the information they needed. Croft and Davis (2010) looked at use of e-Books by students at Royal Roads University in England and revealed that use of e-Books has gone up from 2003 to 2009,

achieving an acceptance rate of 54%. Ongozi and Baki (2010) surveyed graduate students in Turkey and discovered that they are aware of the convenience of e-Books, but preferred to use these resources mainly for academic and not leisure purposes. Moreover, Shelburne (2009) examined library patron usage patterns and attitudes toward e-Books, reporting that the acceptance of e-Books has reached levels making them a key library service.

Several studies on the use of e-Books in libraries have been conducted investigating the benefits, challenges, and how the technology affects the traditional library (Chu, 2003; Gibbons, 2001; Herring, 2003; Lonsdale & Armstrong, 2001; Ramirez & Gyeszly, 2001; Reed, Flinchbaugh, & Moskal, 2004; Shepherd & Artega, 2014). However, technology is changing and so are the generations. Therefore, it is interesting to see where we are today. Not surprisingly, research shows that e-Books are more accepted in certain subject areas such as Computer Science and Business (Dillon, 2001; Fernandez, 2003; Ramirez & Gyeszly 2001). At Duke University, it was found that e-Books were more popular among Computer Science, Psychology, Medicine, Religion and General Social Sciences students (Littman & Connaway, 2004). Shepherd and Artega (2014) conducted a survey of e-Book preferences among students in the social work program at the school library and found that while not all students are fond of e-Books, they are willing and likely to use e-Books purchased by libraries. Organizations like ACM offers books to its members 24 hours per day, seven days per week. A study by Gibbons (2001) looked at e-Book usage within the library system in Rochester, New York. The results were mixed, with several survey participants stating they would use an e-textbook over a hard copy book, but some reporting no preference at all. They also stated that the benefits of e-Books are being able to adjust the font size, ability to store multiple books on devices, and adjust the back-lighting features. It is possible that the variation in readers' preference might have to do with the type of technology they chose to read their electronic textbook on (Grasha & Yangerber-Hicks, 2000).

There are both advantages and disadvantages to e-Books. The following are some of the advantages of electronic textbooks over traditional textbooks reported in the literature.

- Portability – electronic books offers convenience, as it is easier to bring books with you while on the go (Gomez-Borbon, 2013; Rodzvilla, 2009),
- Software Features – being able to adjust the font, lighting, search capabilities, highlighting, note taking, and cut-and-paste functions are considered an advantage (Behler and Lush 2010; Croft and Davis 2010; Harness, 2014; Ongozi and Baki 2010).
- Storage – the storage space on tablets and laptops are quite big as well as there are cloud options available, this allow user to have multiple books stored in one place (Gomez-Borbon, 2013; Harness, 2014).

Even though the technology is fascinating, there are also disadvantages to electronic reading.

- Eyestrain – it might be hard for a person to read over a longer period of time (Hoseth & McLure, 2012).
- Resale Value – when opting for an electronic version there would be no cash back (Harness, 2014).
- Screen Size – mobile devices and computer screens tend to be quite small making it aquad and impossible to see the entire page (Harness, 2014).
- Skim Information– users tend to skim the information instead of reading the full chapters and taking notes (Rosenwald, 2015).

Publishing companies are continuing to push for electronic book sales. The major publishing companies in higher education are: Taylor & Francis, Pearson, McGraw-Hill Education, Cengage, Springer, Houghton Mifflin Harcourt, and John Wiley & Sons (Band, 2013; Dubay, 2016). Pearson offers students 50% savings on many titles and instructors get free access on their Vital Source website (Ravipati, 2017). However, many times there is not much of a difference when comparing prices. The product capabilities are getting better and more reflect the traditional reading experience. However, it may still take time for electronic books to more fully become the choice and for users to become comfortable and familiar with the options available.

### **Characterizations of the Generations**

In addition to the above factors, there may well be important generational differences that contribute to the acceptance of e-Book versions of academic textbooks. The characteristics of the various generations differ. Generation Z is the first generation truly growing up with technology and perhaps they can be expected to be more comfortable and inclined to go digital. Generation Z is the generation born after the millennials. There are no precise dates but sources indicate 1995 to present. They are also known as the iGeneration. This generation is very dependent on IT and have little grasp of alternatives. Their signature products are said to be Google glass, graphene, nano-computing, 3-D printing, driverless cars, etc. (Wikipedia, 2017c). Their way of communicating is by hand-held (or integrated into clothing) communication devices. They prefer FaceTime, Twitter, and Snapchat to face-to-face when communicating. When making purchasing or financial decisions, their solutions will often be digitally crowd-sourced by putting out request or asking questions to their huge lists of “friends” and “followers” rather than researching other sources (Robertson Associates, 2013). Generation Z is further seen as being global, socially connected, visual and technological. This is the new social media class, who has been shaped by the prior millennial generation but now shaping technology and social media in a different way than the prior cohort. Perhaps, however, an even newer development among people of this generation is to favor immediate social platforms like Snapchat rather than broadcasting their lives widely and publicly on Facebook and Twitter for all to read and see. Perhaps fittingly given the pace of development and this generation’s fondness for innovation, Facebook and Twitter are increasingly becoming “old,” joining what to them is an “ancient” form of communication, E-mail.

On the other hand, Generation Y is the group of individuals following Generation X. They are referred to as the millennials. There are no precise dates but sources often place them as being born between 1981-1995. They are defined as digital natives and their signature products are tablets and smart phones. Their preferred way of communicating is by SMS and social media. They prefer online or mobile (text messaging) communications and face-to-face when making financial decisions. Generation Y has a clear passion for technology. They like using it and prefer to learn in team settings rather than individually (Childs, Gingrich, & Piller, 2009; Coates, 2007; Dulin, 2005; Robertson Associates, 2013; Shih & Allen, 2007; Wikipedia, 2017d). This group of individuals have always been treated as very special, they have been sheltered from the world and highly attended to by their parents. They are motivated, goal- and future-oriented, and looked upon as team-oriented (Howe & Strauss, 2003). Millennials have now passed Baby Boomers as the nation’s largest generation (Fry, 2016).

Generation X is the group of individuals born after the generation referred to as Baby Boomers (BB). There are no precise dates but sources indicate those born between 1961-1980. This generation is defined as digital immigrants. Their signature product is the personal computer. Their preferred method of communicating is by e-mail or SMS. They prefer text messaging or e-mail over face-to-face meetings. When making purchasing or financial decisions, they prefer online meetings and face-to-face if time permits (Robertson Associates, 2013; Wikipedia, 2017b).

Finally, Baby Boomers are the generation of people born after WWII until about the mid 1960s. They are considered being early information technology adaptors. This generation’s signature product is the television and their preferred way of communicating is by telephone. This group prefers face-to-face meetings, followed by phone, and lastly, by e-mail. When making financial decision, they prefer face-to-face but in increasing numbers will go online (Robertson Associates, 2013; Wikipedia, 2017a).

Knowing this, it is interesting to see how the iGeneration differs from the other generations. They are supposedly the tech generation. For our purposes, we will be focusing on the differences between Generation Z students, which most college students belong to today, and all other generations collectively as these older generations are seen less in university settings as the years go on.

### **METHODOLOGY**

Hawaii Pacific University (HPU) is a private university located in Honolulu with approximately 4,360 students. A survey was randomly distributed, mainly targeting freshman students, but also reaching other classes of students as well. The largest group of students were born after 1995 and known as Post-Millennials, iGeneration, Founders, Plurals or the Homeland Generation (Wikipedia, 2017c), but they are referred to here as Generation Z. The survey



consisted of 14 questions and included demographic questions such as major selected, level in school, gender, age, and country of origin. In addition to the demographic questions, there were items designed to answer the following research questions: (1) *How does the student's major in college, gender, generational age relate to e-Book use?* (2) *What are the types of e-Books used?* (3) *What is their rate of use?* (4) *What are the most influential factors regarding electronic textbook adoption?*

Students were asked to identify the electronic devices they currently own such as smartphone, laptop, desktop or e-Book reader. They were asked to rate their preferred device and to share their satisfaction with the technology of each device category and to identify any shortcomings. The survey asked participants to expand upon their preferences by reporting their reading habits such as the amount of reading done electronically, as well as when they read an e-Book last, and how frequently they use an e-Book. Additionally, they were asked to share what materials they preferred to read on their devices; such as recreational reading, class reading, work reading or user manuals.

### FINDINGS

A total of 319 questionnaires were returned, with all of them fully completed. The participants were split nearly equally by sex, with 52% percent females and 48% males. While every populated continent was represented in our sample, the majority of participants (77%) originated from the United States. As this was conducted in Hawaii, 84 (26%) of the students were from the state, 164 (51%) from the rest of the US, 22 (7%) from Asia, 21 (7%) from the Middle East, 17 (5) from Europe, and the remaining 3% were from South America, the Pacific Islands, and Africa. The majority of these students were therefore only in Hawaii for the purposes of their studies which gives the results a more national and global perspective as the participants bring with them their knowledge, culture, and experience. Nevertheless, with such small sample sizes in several of the categories, we opted not to try to make inferences pertaining to location of origin in this study and this information is reported only for the sake of interest.

The participants ranged in age from 18 to 59 and their age was used to determine to which Generation they belonged, as defined above. Table 1 lists the number and percentage of students in each Generation. Most participants (63%) were Generation Z, but Generations Y, X, and Baby Boomers were also represented. However, not surprisingly, there were too few Generation X and Baby Boomer students to make conclusive determinations about these specific generations so comparisons were made only between Generation Z and the other three generations collectively.

**Table 1.** Participants by Generation

Generation	Years of Birth	N=319	%
Gen Z	1995-now	201	63.0
Y, X, and BB combined		118	37.0
Gen Y	1981-1995	86	27.0
Gen X	1961-1980	28	8.8
Baby Boomer (BB)	1945-1960	4	1.2

Table 2 depicts the breakdown of the participants by their Program of Study at the university. Note that several students reported dual majors so the total exceeds 319. With convenience sampling, the largest number of participants were from the Information Systems program, followed by Marine Science, Nursing, Business, and Health Science. In addition to students who had not yet declared a program of study, 22 programs were represented. Collectively, Information Systems (a masters level program), Computer Information Systems, and Computer Science (bachelors level programs) comprise what we will refer to as Information Technology (IT) Programs and these 108 students account for 33.9% of the participants. The IT students were significantly more likely to prefer reading e-Books than students from all other programs collectively, with a means of 2.86 (SE=.12) and 2.39 (SE=.08), respectively,  $t(317)=3.36, p < .001$ . The effect size for this difference is quite low, however ( $r^2=.03$ ).

**Table 2.** Student Program of Study

Degree Program	N=319
Marine Biology	48
Nursing	35
Business	33
Health Sciences	22
Undeclared	15
Communication	11
3-2 Engineering	10
International Studies	8
Computer Science	6
Psychology	5
Education	5
Chemistry	3
Sociology	3
Environmental Science	2
English	2
Social Work	2
Anthropology	1
Information Systems	92
Computer Info. Systems	13
MBA	9
Human Resources	3
Global Leadership	1
Diplomacy, Military Studies	1

As can be seen in Table 3, which depicts how device ownership compares between the younger (Generation Z) and older (Generation Y, X, and BB) participants, students are becoming more tech dependent. Among Generation Z, 94.5% own a laptop, 92.5% own a smartphone, 39.8% own a tablet, 22.4% own a desktop, and 14.9% own an e-Book reader. Most students reported owning several electronic devices. These results are quite similar to the national ECAR study, where 90% of the students reported owning a laptop, 86% owning a smartphone, followed by tablets at 47% (Dahlstrom & Bichsel, 2014). This trend is also quite noticeable in the classroom where students are often seen bringing multiple devices to classes. The result shows that students are choosing to use mobile devices over desktops. As the literature suggests, Generation Z seems not to even fathom not being connected to the Internet. Compared to Generation Z, the older participants (Generation Y, X and Baby Boomers) are more likely to own a desktop, a tablet, and an e-Book reader. However, we can see Generation Z is slightly more likely to own a smartphone, though not by much.

**Table 3.** Devices Owned by Students

Device	Gen Z	%	Gen Y, X, BB	%	% Points Difference
Smartphone	186	92.5	107	90.7	+1.80
Tablet	80	39.8	68	57.6	-17.80
Laptop	190	94.5	113	95.8	-1.30
Desktop	45	22.4	58	49.2	-26.80
e-Book Reader	30	14.9	31	26.3	-11.40

Participants responded to a question regarding their frequency of reading e-Books on a scale of 1-5 (from None to All of their reading), which perhaps also reveals their reading platform preference. Table 4 summarizes these Online Reading Habits of the participants.

Table 4. Online Reading Habits

Online Reading Habits	Gen Z	%	Gen Y, X, B	%	% Points Difference
All of my reading	8	4.0	14	11.9	7.9
About two-third of my reading	30	14.9	29	24.6	9.7
About a third of my reading	41	20.4	22	18.6	1.8
Less than a third of my reading	63	31.3	40	33.9	2.6
None	59	29.4	13	11.0	18.4

An initial question might be, do males and females differ in their e-Book reading preferences? The mean for males on this item was slightly higher at 2.66 (SE=.10) than for females (2.44; SE=.09). This difference was not significant, however,  $t(317)=1.62$ ,  $p=.11$ . When asking Generation Z participants regarding their reading habits, 4.0% reported they read all their books online, 14.9% read about two thirds of their books online, 20.4% read about a third of their books online, 31.3% reported less than a third and only 29.4% choose not to purchase online books. This means that 70.6% of the Generation Z students do at least some reading online. This contrasts, perhaps surprisingly, with the 89% of older students who reported doing at least some of their reading online. Given that the older generation students were more likely to own Tablets and/or dedicated e-Book Readers, perhaps this is simply due their being more likely to have devices most commonly used for e-Book reading. Additionally, the mean response to this question given by the “younger” students (Generation Z) was 2.33 (SE=.08), indicating a significantly lower preference for reading e-Books than the “older” students (Generations Y, X and BB) with a mean of 2.92 (SE=.11),  $t(317)=4.32$ ,  $p<.001$ . The effect size for this difference, however, is only moderate ( $r^2=.06$ ).

A question was raised to find out when was the last time the students surveyed read an e-Book, and that data can be seen in Table 5. From the survey responses 50.7% reported a week ago or less, 15.4% reported a month ago or less, 13.9% reported a year ago or less, and 19.9% more than a year ago. The way the answer options were coded to a 5-point scale for analyses, higher scores indicate a shorter period of time since last reading an e-Book. On average, older students reported reading an e-Book more recently than Generation Z students with means of 3.20 (SE=.09) and 2.97 (SE=.08), respectively. This difference, however, was not significant,  $t(317)=1.78$ ,  $p=.08$ . Some evidence does indicate that younger generations do read less online than older generations and that Generation Z is not as tech savvy as we might think but more comfortable using technology (Plant, 2015; Sidibe, 2015; TechBundle, 2016). Generation Z might be fond of exciting new technology but reading textbooks online requires a different form of discipline due to potential distractions. Perhaps the older generation is more accustomed to consuming information, whether online or not. Though not quite significant here, this is something perhaps our data was trending toward.

Table 5. Reading E-Books

When did you read an e-Book last	Gen Z	%	Gen Y, X, BB	%	% Points Difference
A week ago or less	102	50.7	63	53.4	2.7
A month ago or less	31	15.4	25	21.2	5.8
A year ago or less	28	13.9	21	17.8	3.9
More than a year ago	40	19.9	9	7.6	12.3

Table 6 displays how frequently Generation Z and the older Generations (Y, X, and BB) use e-Books. Generation Z reported 13.6% less daily use of e-Books than the older Generations. The way the answer options were coded to a 5-point scale for analyses, higher scores indicate more frequent use of e-Books. Older Generation students used e-Books more frequently than Generation Z students with means of 3.39 (SE=.18) and 2.98 (SE=.12), respectively. This difference very narrowly failed to achieve significance, perhaps due to the relatively smaller sample size of older Generation students,  $t(317)=1.93$ ,  $p=.055$ . This would be an expected result since Generation Z student were less likely to own the most frequently used platforms for reading e-Books (tablets and e-Book readers).



**Table 6.** Frequency Use of E-Books

Frequency Use of E-Books	Gen Z	%	Gen Y, X, BB	%	% Points Difference
Daily	10	5.0	22	18.6	13.6
2-3 Times a Week	53	26.4	25	21.2	5.2
Once a Week	28	13.9	11	9.3	4.6
2-3 Times a Month	17	8.5	14	11.9	3.4
Once a Month	17	8.5	11	9.3	0.8
Less than Once a Month	76	37.8	35	29.7	8.1

Table 7 displays the rates of device preference when reading e-Books across the two age groups. Given the popularity of tablets, it is not surprising that both age groups reported high percentages for tablet preference, with 30.8% of Generation Z indicating this to be their preference and 33.1% of the older students reporting it to be theirs. Perhaps it is surprising that tablets were not the first preference among Generation Z, with 41.3% reporting that laptops were their preferred platform for reading e-Books. Again, perhaps this is simply due to the fact that they are less likely to own a tablet or e-Book reader. One would probably not report a preference for using a device one does not own or have access to.

**Table 7.** Device Preference for E-Books

Device Preference	Gen Z	%	Gen Y, X, BB	%	% Points Difference
Smartphone	30	14.9	13	11.0	3.9
Tablet	62	30.8	39	33.1	2.3
Laptop	83	41.3	36	30.5	10.8
Desktop	4	2.0	12	10.2	8.2
e-Book Reader	22	10.9	18	15.3	4.4

Table 8 compares the combined value (agree/strongly agree) between generation Z and generation X,Y,BB to questions about types of material read online. The older generation is more fond of reading online in any of the categories. The percentage point difference is found to be highest for user manuals at 35.3% compared to 30.3% for work related. One would think that there would be a very high rate of reading user manuals online as these tend to be placed more and more online.

**Table 8.** Material Read

Material Read	Gen Z	%	Gen Y, X, BB	%	% Point Difference
Recreational Reading	86	42.8	74	62.7	19.9
Class Reading	110	54.7	81	68.6	13.9
Work Reading	77	38.3	81	68.6	30.3
User Manuals	67	33.3	81	68.6	35.3

In addition, as can be seen in Table 9, 32.8% of the Generation Z students preferred to use electronic textbooks for their college courses while 55.9% of the other generations were in favor. This is a 23.1 percentage point difference. However, we can clearly see that the other generations favor e-Books more than Generation Z. The other generations scored higher in all categories. This is surprising because Generation Z is the group that has lived with technology all their lives. The percentage point difference is quite large in every single category.

Table 9. Satisfaction with Technology

Satisfaction	Gen Z	%	Gen Y, X, BB	%	% Point Difference
I find it easy to use an electronic textbook	130	64.7	89	75.4	10.7
I am comfortable using an electronic textbook	132	65.7	91	77.1	11.4
It is easy to look up information in an electronic textbook	119	59.2	96	81.4	22.2
Electronic textbooks give me the freedom to learn the way I want	83	41.3	74	62.7	21.4
Using an electronic textbook is effective for learning the material	95	47.3	79	67.0	19.7
I prefer electronic textbooks for my college courses	68	32.8	66	55.9	23.1

The survey also addressed potential shortcomings of electronic textbooks. Participants were asked to state how strongly they agreed or disagreed (on a 5-point scale) with statements about potential shortcomings of e-Books including “cost of the reader,” “limited selection of e-Books,” “lack of note taking/highlighting abilities,” and so on. Generation Z reported that the biggest shortcoming of e-Books is the distraction presented by being connected to the Internet while the older Generations rated this just the sixth most important shortcoming. Furthermore, 74.6% of Generation Z students agreed or strongly agreed with that statement while just 53.4% of older Generation students did. With a mean level of agreement of 4.07 by Generation Z students, this particular shortcoming was the most agreed-upon of all 12 potential shortcomings seen across both sets of students. For older Generation students, the biggest shortcoming was reported to be the limited selection of e-Books, while for Generation Z, this was only their ninth largest concern. For Generation Z students, the second biggest shortcoming of e-Books is the lack of note-taking/highlighting abilities and this was the fourth largest shortcoming for older students. The second-most agreed-upon shortcoming by the older Generation students was to the statement “I am happy with the technology,” whereas this was the second *lowest* most agree-upon statement for Generation Z. Interestingly, Generation Z agreed more strongly with the statement “I prefer print books for my college courses” than did older Generation students, with means of 3.68 (SE=.08) and 3.44 (SE=.11), respectively. However, the difference between these two mean levels of agreement was narrowly not significant,  $t(317) = 1.75$ ,  $p = .08$ . Nonetheless, the authors wonder if the younger students know their potential to be distracted by the pull of the Internet and therefore are more likely to prefer that their textbooks be of the printed variety in order to help reduce this tempting distraction. With just 35.3% agreeing, Generation Z was less likely to report being “happy with the technology” of e-Books than the 54.2% of older students who reported being happy with it. The two Generations did not show very different ratings about other potential shortcomings of e-Books. The least agreed upon shortcoming for both Generations is that it takes too long to read an e-Book.

Last, participants were asked to state how strongly they agree or disagree (using a 5-point scale) with statements about potentially important features of e-Books, including “portability,” “convenience for acquiring books,” “the ability to store many books,” and other “special functions.” Special functions refer to having built in dictionaries, Internet access, font adjustment and other customizations, and ability to play audio, video, etc. Table 10 summarizes the number and percentage of students in both Generations in agreement with these statements. Both generations agreed most that portability is an important feature and reason why they would choose to read a book electronically. The ability to store several books followed by convenience were rated highest among the older generations while Generation Z rated special functions followed by convenience as their priorities.

Table 10. Percent Agreeing About Important Features of e-Books

Important Features	Gen Z	%	Gen Y, X, BB	%	% Point Difference
Portability	176	87.6	112	94.9	7.3
Convenience for acquiring books	162	80.6	104	88.1	7.5
Ability to store many books	158	78.6	106	89.8	11.2
Special functions	166	82.6	101	85.6	3.0

## DISCUSSION

The purpose of this study was to find out which variables affect electronic book usage through surveying college students and primarily, to compare preference and acceptance between Generation Z and older Generation students. We gathered information about the e-Book market, and comprehensively analyzed existing research on the subject. One can clearly see that there are emotional factors, price factors and technology factors that come into play.

Our first set of questions pertained to potential differences between the gender, program of study, and generational age of the students. No differences were seen between males and females on any of the factors we explored. Perhaps not surprisingly, Information Technology students appeared to be earlier adopters with slightly higher acceptance and preference for academic e-Book sources than students from other majors. And we outlined the many Generational differences we described above between the younger Generation Z students and the three older generations combined. Our second and third research questions about the types of e-Books used and preferred and rates of use by these two generations revealed some of the largest and perhaps most surprising differences that we saw. Older students rather greatly used and seemed to prefer e-Book versions for recreational, class, work, and user manual types of reading than did Generation Z students. As far as the platforms preferred, however, we saw a consistent pattern of higher level of ownership, use, and preference of tablet and dedicated e-Book devices in older students, likely because these are still considered more luxury or optional devices by younger students presumably with less money to afford these devices in the first place. While Laptop usage was highest among device platform for all participants, it was highest among Generation Z. Our final primary question pertained to the most influential factors regarding electronic textbook adoption. Again, Generation Z being less likely than older students to own and use tablets and dedicated e-Book readers remains a detriment to their acceptance of electronic textbooks. They are frequently not given much of a choice in using them or the fact that e-Book texts are frequently a least expensive option dictates a higher level of use than is perhaps reflected in their actual preference. Interesting, too, was the younger students' higher level of agreement that a disadvantage of using any Internet-connected device for their academic reading serves as a potential or actual distraction for them.

While the present study had a reasonably large sample size ( $N=319$ ), we regret not having access to more students of older generations (X and BB), from more locales, and from more programs of study. Questions remain as to which differences in use and acceptance of e-Book materials for academic use exist between Generation Z and each of the specific older generations. However, we are confident that some patterns in Generation Z can more clearly be seen. Those in higher education will benefit from knowing even better which segments of their membership in terms of age, area of study, and perhaps location of origin as well as other factors will be most and least accepting of this form of technology as we continue to go forward. Technology and innovation will advance. Generational differences will continue to emerge and reveal themselves. Research on these factors must continue.

We do see, however, a widespread use of technology among the student population. One could argue that students need to become better at learning to use the various technologies. This Generation (Z) is curious and likes to try new technologies and the media label them as tech savvy, however, they still need training as the other generations (Sidibe, 2015). As discussed earlier, the acceptance of e-Books is not overwhelmingly positive among Generation Z; they are less likely to own a tablet or e-Book reader and to purchase and read an electronic book than some might think and compared to older generation students. This might be a little surprising given how readily they embrace technology, but perhaps it is simply due to their being less likely to afford /own a tablet or e-Book reader. Users of all generations report being less inclined to read books on laptops, desktops, and smartphones (Derla, 2016; Gregory, 2008). The typical Generation Z student might own a smartphone and a laptop, but not one of the preferred devices for reading books (a tablet or e-Book reader). Hence, they are a bit slower to adapt to e-Books than some might think. The trend toward combination tablet/laptop devices, such as Microsoft's Surface might change this. Of course, personal characteristics can come into play in the adoption process. For now, it is apparent that both e-Books and printed copies still need to be offered as there are too many users not feeling comfortable going 100% online.

Most likely, we will see less printed copies as this is something that is happening in all sectors. Newspapers are successfully moving in this direction. The tourism industry is moving in this direction as well. When you travel, you are now more frequently issued an electronic ticket or boarding pass which you can store on your phone than in

printed form. More and more user manuals are electronic these days, as it costs much to print them, especially in multiple languages. When we shop in a store the receipt is sent directly to us via e-mail. Less official documents are sent out in paper formats and we see organizations offering customers login credentials to view the information pertaining to them. However, the textbook industry needs to continue to make the software more user friendly and more convenient so more people feel comfortable reading a book online. It is currently not attractive enough for some.

Another factor possibly dissuading some from selecting e-Book formats is the lack of standardization. A book you purchase from one source might only work on their software platform. When you buy a printed book that you know you will want to keep for a long time, you do not have to wonder or worry if that format will stay current. Who is to say that a proprietary format such as Nook or Kindle, or even a generic format like pdf will remain available for the long term? We have seen relatively rapid changes in the popular and available formats for other media like video, music, and computer storage. Consumers must surely wonder which e-Book reader format, if any, will pass the test of time. Furthermore, like it or not, people have long been able to share, sell, trade, or give away their books. Sharing or transferring an e-Book may currently be difficult or impossible. Paradoxically, at the very same time, it is easier than ever to pirate or share illicit copies of books and other reading material electronically. In the e-Book publishing sector, it is important then to set a standard for enabling compatibility between products of different entities. Kindle, for example, is quite user friendly, however, some of the software offered by some publishers are quite restrictive or clunky to use.

In an environment where people are also starting to read less (Flood, 2015), it is challenging to energize the e-Book market. We can clearly see this in the classroom. Students are frequently unprepared or even unwilling to do the amount of reading that is required or expected (though perhaps every generation says that about subsequent generations). As this study revealed, Generation Z students are particularly aware of and concerned about the distraction accompanying a reading format that is connected to the tempting Internet. It seems the e-Book needs to be more than just an electronic copy of the paper book, and needs to include all the experiences of the paper book and more. For the e-book to become more popular it needs to be eye-friendly like the paper book but more convenient and easy to read than its paper counterpart. A brilliant innovation of the e-Book is the ability to include more interactive content, other forms of media, and links to other content. The content might need to be differentiated to solve the emotional experience mimicking the paper book. As our results suggest, the publishers also need to reduce the compatibility issue, eye strain, improve the note taking capability, and reduce cost for e-Books to become more attractive. Publishers, libraries, governments, universities may all be needed to publicly promote the e-Book to jumpstart the e-Book market. One should try to market the e-Book as Smart Content Consumption to improve the engagement and conversation. One size fits all doesn't work. Smart content is content that is intelligently personalized to your customer's needs.

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**NOTES**